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In one of the early applications of economic theory to politics, Anthony Downs proposed that voters behaved rationally and based their voting decisions on self-interest.[1] If Party A was likely to give them more of what they wanted than Party B, then they voted for A. What was unique in Downs' approach was that he recognized that it is not so easy to find out how much better a person might be if Party A won the day instead of Party B. Downs realized that the gathering of political information could be tedious; he recognized that the time and effort spent exploring the political arena could be spent on other things. Rather than reading the political columns in the newspaper or watching Sunday morning talk shows, people could put the effort into improving their economic situation directly, say, by taking a second job. Given the competing demands on citizens' time, Downs argued that it is only natural for individuals to try to obtain information with the least effort, or at the smallest cost.

One way to reduce one's own cost or effort is to delegate the job to other people. Downs claimed that individuals may be willing to let editors or columnists do the hard work of figuring out the best candidates, and then simply follow their lead. Following Downs' argument, one might say that having the news media identify "important" stories is one way to lower the cost of becoming informed. There is considerable evidence that the media do play such an agenda-setting role (McCombs and Shaw, 1972). Stories that are prominent in the news media are often rated important by the audience. In the words of Bernard Cohen, the press "may not be successful much of the time in telling people what to think, but it is stunningly successful in telling its readers what to think *about*" (1963, p. 13). The media's agenda-setting function can be seen as an exercise in cognitive efficiency on the part of the audience. Journalists generally share the public's view that they should set news priorities and that their professional training uniquely qualifies them to perform this function for the mass audience.

Delegating story selection to the mass media might lower the cost of being informed but it is only efficient insofar as the assessments of the media and audience coincide. Students of the media have collected a great deal of evidence about the news agenda—that it is event-centered, built around news beats, emphasizes the activities of powerful elites, and gives an extra dollop of attention to items that have exciting visuals or stories that are, or might become, sensational.[2]

If we take the kind of economic approach to news attention that Downs gave to voting, we should expect individuals to weigh the "cost" of a piece of information (in time or attention) against the usefulness of the information or the pleasure one might get out of reading or viewing it. If a piece of information might have a crucial bearing on one's life (did my lottery number come up?, is the nation about to go to war?), the expected benefit of knowing may outweigh the cognitive effort of finding out. Or if a news story appears to be entertaining in and of itself (how did that woman extract herself from the tuba?; what did Gary Hart say to the reporters waiting in front of that Washington townhouse?), individuals might be willing to pay the price in attention in exchange for the entertainment value of the story itself. Applying a cost/benefit approach to the design of news suggests that making a story appear relevant or interesting lowers the information cost to individuals. This may be another way of describing what journalism schools have been teaching as good news craft.

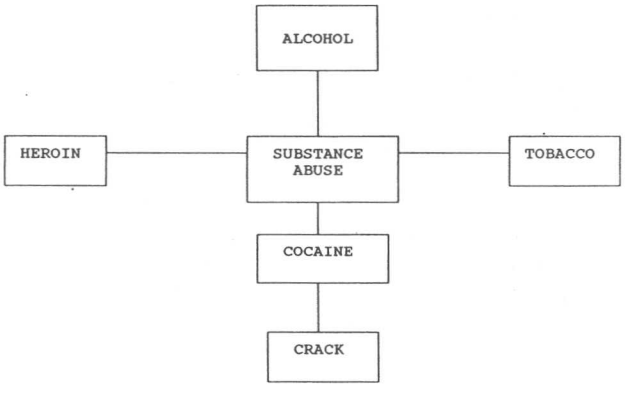
Going beyond the question of selecting items for attention to the actual process of learning, the analogy of costs is still useful. The media may cut information costs by designing news so that people can easily learn the information in the stories. Of course the story design is not the only factor in the economics of learning. Some individuals may store and retrieve information more efficiently than others, and particular topics may intrinsically have high or low costs based on the utility or entertainment value of the content. The same story might even have different costs for different people, depending on the skills and interests of the individual.

If we think that one of the important jobs of the news media is to inform the public about the whole range of things that citizens in a democracy need to know, then it should also be the job of a good press to make that information as accessible as possible to the public. Using the language of economics, the media ought to be trying to keep down the cost of information for the public. The news media should be trying to present political information so that people can learn it. Unfortunately, it is not so clear how to do that.

The answer is tied up with an understanding of how people learn—a topic developed not in

economics, but in psychology. The literature on cognition emphasizes the importance of new information being meaningful to the individual if it is to be interpreted, retained, and recalled. Numerous studies illustrate the relative ease of memorizing a meaningful story or script as opposed to nonsense syllables or random digits.[3] Using this important observation, students of cognitive psychology have developed models of how people think. One model of cognitive function, the semantic network, looks like an airline route map. A new stop has to be hooked up to one of the hubs. In the semantic network, a new piece of information, such as "cocaine," is inserted by linking it to an established node, such as "abused substances." The route or connection between the new bit and the old bit would be the logical expression: "belongs to the category of." See Figure 1.

Figure 1
Schematic Diagram of a Semantic Network



The network would convey that "cocaine belongs to the category of abused substances." With the addition of new information bits, the network around the node "cocaine" may become more complex; for example, another whole-part link might be forged between cocaine and the node "crack," and a "consequences" link might connect crack with street crime. The more links between the new bit and the network, the more firmly anchored it is in the individual's memory. And just as it is easier to get to a heavily-serviced air hub like Chicago than it is to get to Kalamazoo, the easier it is to recall a piece of information that is linked to many nodes in the semantic network rather than an isolated fact.

If a news story contains clues as to how to store new pieces of information, i.e., how to link the new node to which hub, learning information from the news story can be made less costly for the individual. For example, in the case of addiction to crack (a term which initially was new to the audience), a journalist might analogize to the abuse of alcohol (a substance with which the audience is more likely to be familiar). Likewise the term "abuse" will help the individual remember what was learned about cocaine by linking back to the "abuse" node.[4]

Who Learns What from the News

In the economic analogy, individuals with sophisticated semantic networks have lower costs for storing and retrieving new information than individuals whose semantic networks are more rudimentary. It is not clear, however, just what it is that makes a semantic network most receptive for learning. Some researchers think that the key ingredient is an innate mental ability to organize information;[5] others argue that it is not how the network is organized in general but how much activity there is around any particular hub.[6] Media researchers have pointed both to "skills for abstract inference" and "general knowledge" as critical to learning from the news.[7] Clearly, the two factors distinguish people from one another in very different, and very important ways. If what really counts is brain power, then unless there is a lot of it to go around, we should not expect much learning from the news no matter how it is presented. If learning is a matter of accumulating information about matters of interest, then presumably large numbers of people have the potential to become interested in topics in the news. Which of these hypotheses is correct has important implications for the media's role in the democratic process.

The Study

The data testing these hypotheses are drawn from a series of learning experiments on five topics in the news in the period 1985 to 1987.[8] For each experiment in the series, a sample of 180 adults was selected from a shopping mall north of Boston, Massachusetts. The individuals in each experiment were randomly assigned to read or view news stories on the same general topic in the news of the period: apartheid in South Africa, Star Wars (the Strategic Defense Initiative), the stock market crash of 1987, drug abuse, and AIDS. For these experiments, stories covering the same events and containing parallel information were selected from network news,

news magazines and newspapers.[9] In the course of the experiments, the subjects' knowledge of the particular topic was assessed before and after exposure to the news stories.[10] In addition, individuals were given a brief cognitive skills test, and asked a number of questions concerning their media habits, interest in the topic, and interest in politics in general.

The data support the conclusion that people have an economic approach to news attentiveness. Subjects were not equally interested in all issues. Of the five topics, the ones that interested them most either touched their lives or could be experienced directly, (AIDS and drug abuse), closely followed by the economy, with South Africa and Star Wars much in the rear. See Figure 2. In looking at the way people felt about these issues, it seems that subjects attached higher information costs to issues that were less important to them personally and lower costs to issues they believed were relevant to them. For example, subjects rated the distant issues, Star Wars and South Africa, as more "difficult to understand" than the personally relevant issues of drug abuse or AIDS. The stock market crash was somewhat anomalous. People thought the economy was "important," but "difficult to understand." See Figure 3. What is important about these data is that information costs (inferred from categories of "hard" or "easy" news) predict how much attention people pay to news stories. Subjects generally claim to pay less attention to news about the "hard" subjects—apartheid in South Africa or Star Wars—than about "easy" subjects—drug abuse, and AIDS. Compare Figure 4, which reports attention to news about the issues with Figures 2 and 3 (personal importance and perceived difficulty of the topic).

Figure 2
Personal Importance of Five Issues

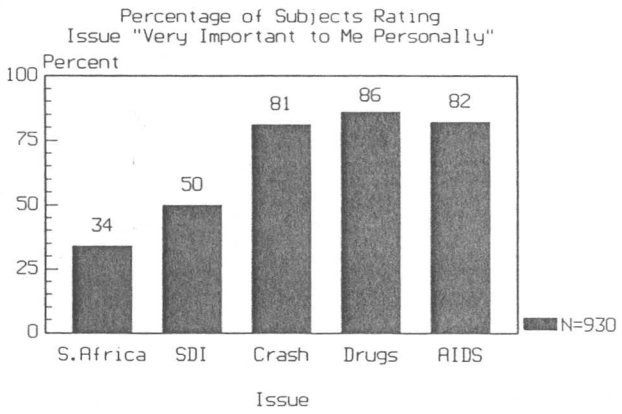


Figure 3
Perceived Difficulty of Five Issues

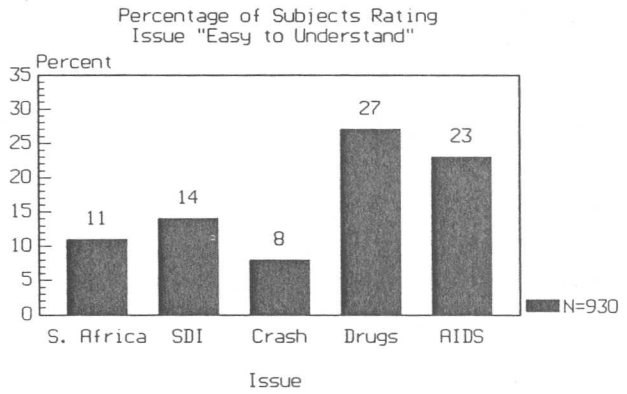
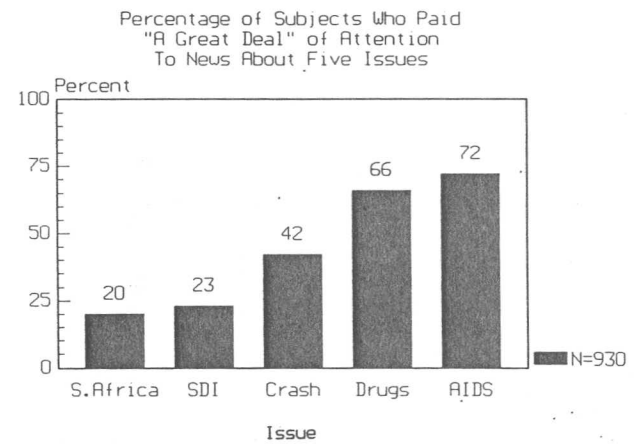


Figure 4
Attention to News about Five Issues



By looking at what people actually learned from the news in our experiments, it was clear that "cost" factors do add up. Using the technique of multiple regression, we calculated how well various factors predicted the level of information people had about a particular news topic. Subjects who claimed that they paid attention to an issue in the news knew more about the topic than those who did not bother, but the ability to draw inferences was the next most important factor in knowledge scores.[11]

Compensatory Advantages in Learning

Given the finding that both interest and skill are important for knowledge, we could ask whether interest can make up for skill. Can interest help to cut information costs for those

who are less cognitively skilled? To address that question the subjects were divided into four groups depending on whether they scored above or below the median on cognitive skill and on attention to news about the issue in the experiment. The resulting four groups were:

Group 1	Group 2
low cognitive skill low attention	low cognitive skill high attention
Group 3	**Group 4**
high cognitive skill low attention	high cognitive skill high attention

We expected that people whose cognitive skills were not so strong and who paid little attention to the topic in the news (Group 1) would have the least information to begin with, while those who were strong in both skill and attentiveness (Group 4) would have the most; but for those groups that were deficient either in cognitive skill or in motivation, (Group 2 or Group 3), it was an open question. We thought it likely that the ability of individuals to overcome a deficit in cognitive skill might vary with the complexity of the material that would have to be mastered. Therefore we analyzed the results by issue. See Figures 5 to 9.

Figure 5
The Compensatory Effect: The Interaction of Interest and Cognitive Skill—South Africa

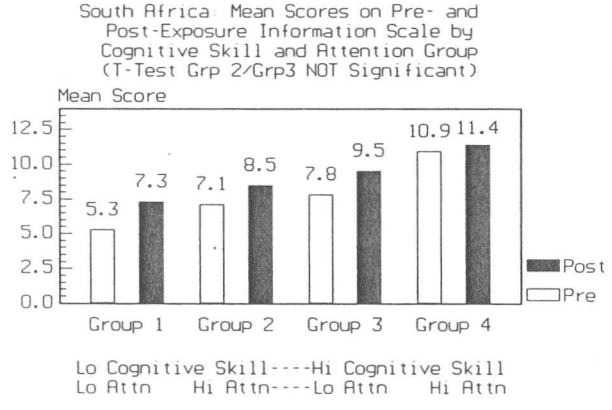


Figure 6
The Compensatory Effect: The Interaction of Interest and Cognitive Skill—SDI

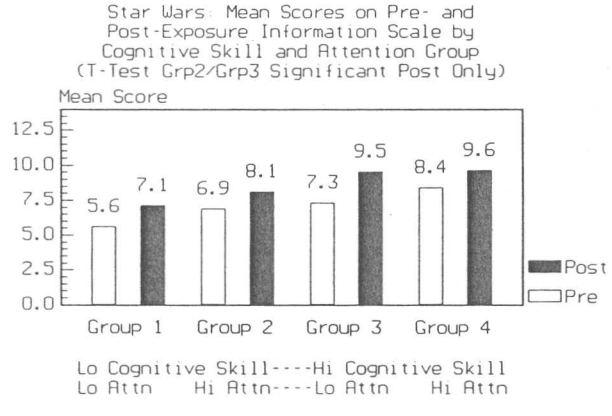


Figure 7
The Compensatory Effect: The Interaction of Interest and Cognitive Skill—Crash

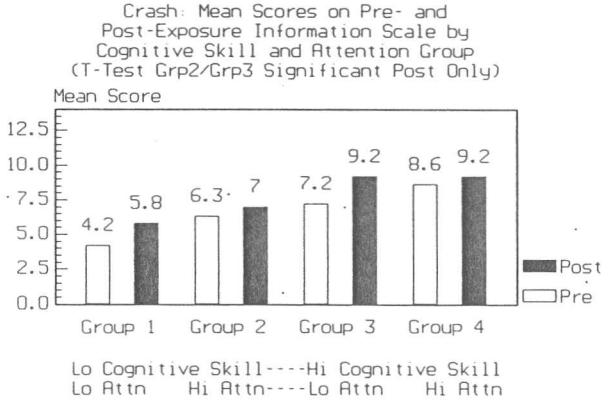


Figure 8
The Compensatory Effect: The Interaction of Interest and Cognitive Skill—Drug Abuse

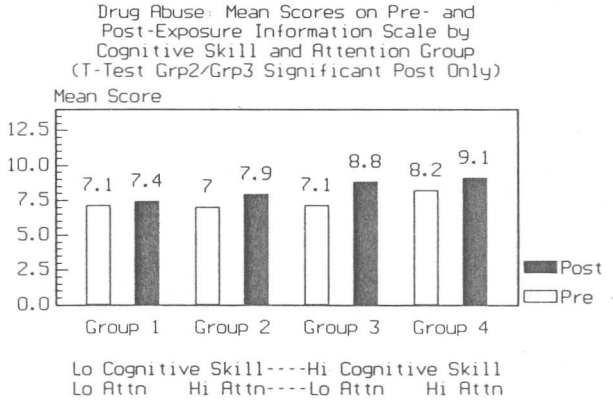
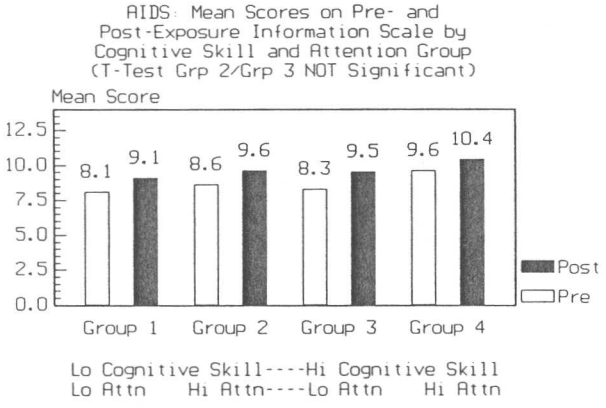


Figure 9
The Compensatory Effect: The Interaction of Interest and Cognitive Skill—AIDS



Figures 5 to 9 show that the importance of both cognitive skill and attention to news vary considerably by issue. Subjects in Group 1 (who had lower cognitive skills and had not paid attention to the topic before) were at the greatest disadvantage in those issues where media are the primary or sole sources of information—foreign affairs, defense policy, and the stock market. On those issues, Group 1 scored on average about five correct answers, only half the score of Group 4 (high cognitive skill and high attention to news). By way of contrast, for the issues of drug abuse and AIDS, where other people and the entertainment media are significant sources of issue information, there were relatively small differences among all four cognitive skill and attention groups.

An important democratic concern is explored by comparing Groups 2 and 3. Here the data tell an interesting tale. On the prior knowledge index, the difference in mean scores between subjects in Group 2 (low cognitive skill/high interest) and Group 3 (high cognitive skill/low interest) was less than one item and was *not* statistically significant. As far as the five topics in the study were concerned, virtually anyone who was interested enough to follow the news had as much information to start with as someone who was cognitively skilled but not particularly interested in the topic. After exposure to news, all of the groups showed an increase on the issue information scales and in most instances, the learning pattern for all four groups paralleled the pattern for prior knowledge: the information gain for Groups 2 and 3 was *not* significantly different. On the two issues, however, that involved technical information—Star Wars and the stock market crash—subjects with high cognitive skills and low attention learned significantly more than those with low cognitive skills and high attention, even though the two groups had scored about the same before the news exposure. Clearly cognitive skill is an advantage in understanding news about some technical topics. For the remaining issues—drug abuse and AIDS, and even for news about a very distant place—South Africa, the data indicate that motivation can indeed compensate for cognitive ability both in the acquisition of knowledge (assessed in the pre-exposure information scale) and in learning (assessed by the difference between pre and post-exposure information scales).

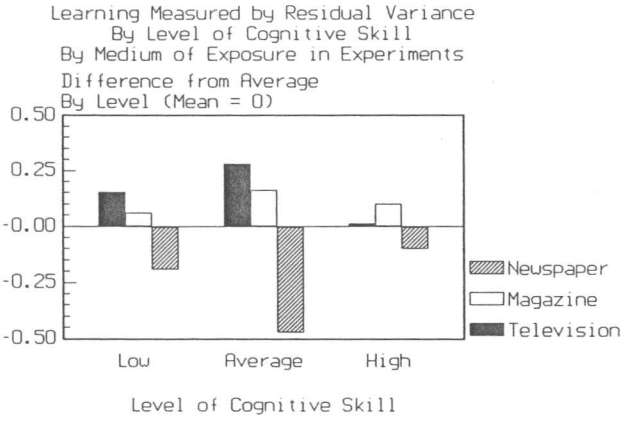
Media Deficits and Compensations

If cognitive skill is not essential to learning about all but the most technical topics, it could still be important to learning from different media. One medium might have much higher information costs than another, either because of the channel in which the information is conveyed, e.g. in print instead of video, or because of the style in which news is presented, e.g., an inverted pyramid as opposed to an informal narrative. Our experiments provided an important opportunity to test the reputed appeal of television to the "lowest common denominator" vs. the "high brow" advantage of newspapers and magazines. Would people with low cognitive skills learn more from TV while the highly skilled learned more from newspapers or news magazines?[12]

Figure 10 shows the relative learning rates for all five issues by medium and by the individual's level of cognitive skill. Subjects with strong cognitive skills learned rather less from TV and more from magazines, but the differences were not significant. Subjects with average cognitive skills, however, showed a different and dramatic pattern. Those who watched the news on television learned the most and the magazine group made a good showing as well. But the *average* subject found it far more difficult to learn from newspapers than from television or from news magazines. See Figure 10. In the newspaper condition, subjects with average cognitive skills (who scored in either quartile around the median in the cognitive skills test) learned less than average in the experiments. Since both newspapers and magazines are print media, reading ability

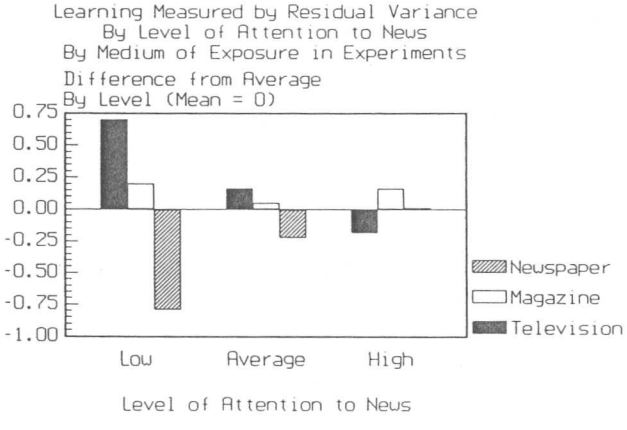
could not account for the poor showing of newspapers. Rather the interaction of medium and cognitive skill reinforces the finding that journalistic formats make a difference.

Figure 10
Issue Knowledge Gain by Media by Cognitive Skill



One might well wonder whether the media also make a difference to people who have not paid much attention to the news. The data show a rather different pattern. Which medium the subjects were exposed to made no significant difference to people who reported either medium or high attention to news. They scored about the same in all media conditions, no matter what the level of information they had to begin with. But individuals who claimed that they "did not pay much attention at all to the news" did exceptionally well if they were exposed to the news on television, and exceptionally poorly if they were exposed to newspaper news. See Figure 11.

Figure 11
Adjusted Learning Gain by Medium, by Level of Attention to News; All Issues Together



The results indicate that the structure and style of newspaper journalism makes it harder for inattentive people or individuals with just average cognitive skills to learn information about political issues. The presentation of news on television and in magazines, however, seems to enhance the ability of ordinary people to learn, so much so that their performance is not significantly different from people with above-average cognitive skills. In terms of the "cost of news" television is an efficient choice.

News Media, Issues and Citizens

The evidence offered here supports a view of the news that emphasizes the cost of news and how costs vary depending on the topic as well as the news medium. Not surprisingly, cognitively skilled individuals had the lowest costs. They learned the most no matter which medium they were exposed to in these experiments. Even those cognitively skilled individuals who had not been attentive to news about South Africa and Star Wars had a significant edge in learning. How much advantage was conferred by cognitive skill, however, varied with the issue. Individuals with strong cognitive skills did not learn appreciably more than those who were less skilled when the issue was drug abuse. In fact, for both health issues—drug abuse and AIDS—even the combined disadvantages of low cognitive skill and low attention to news did not appreciably handicap learning. The results also show that while cognitive ability is an advantage, motivation can compensate with respect to most non-technical, public issues. In all of the experiments except Star Wars and the stock market crash, there were no differences in the amount learned by the cognitively skilled versus the high attention group. This finding is very reassuring from the perspective of democratic competence. People have the capacity to become informed when their interest is aroused.

The evidence from these experiments is that television and magazines were more accommodating for people with average cognitive skills because they offered their audiences a package of information that made it easier to store the new bits of information embedded in the news story. Newspapers were not as likely to package information in a way that could provide less skilled individuals with clues to meaning, although they did not hamper skilled or well-informed readers. On television, the information in news stories was packaged in a narrative

structure and accompanied by reinforcing visuals. In magazines, the news package was discursive, with historical background and speculation about the impact of policies and events, and in that way providing a useful context for new information. The data suggest that either visual or analytic packaging cuts the cost of processing news by giving the audience a "bundle" of information that could be stored *en bloc* in the semantic network. The newspaper's inverted pyramid seemed to be efficient only for highly skilled people or for topics where people already had a great deal of information to begin with.

The media learning differences that we found in our data point to some things that all of the news media can do to cut the information costs for people who are not highly skilled or very knowledgeable about a topic. Some of television's visual images and narrative structure could be adapted by print media. Likewise, television and newspapers could provide the discursive informational context that make magazines so effective for learning. The results reported here suggest that putting the news in context could compensate members of the public who have to overcome high costs in becoming informed about complex issues.

Endnotes

1. Downs, 1957.

2. Lippmann, 1922; Blumler and Katz, 1974; Epstein, 1976; Gans, 1979; Graber, 1984.

3. Norman, 1982.

4. The journalist seeking to cut the cost of learning new information may successfully attach new information to existing schema, (e.g., analogizing the search for a vaccine for AIDS to the eventually successful search for a vaccine for polio), but must be alert to the pitfalls of the stereotypes or misleading analogies that may be inherent in those schema. Rosch, 1977.

5. Schroder, Driver and Streufert, 1967; Neuman, 1986; Rosenberg, 1988.

6. Fiske, Kinder, and Larter, 1983; Natchez and Bupp, 1968.

7. Findahl and Hoijer, 1976. For evidence that better informed people learn more (the knowledge gap hypothesis), see Tichenor et al., 1979; Moore, 1987; Neuman, 1982.

8. For further description of the study design and findings see papers presented at the American Political Science Association Annual Meetings: Neuman, Just, and Crigler, 1988; Just, Neuman, and Crigler, 1990; Crigler, Just, and Neuman, 1991; and Neuman, Just, and Crigler, 1992. The study was funded by a grant from the Spencer Foundation. The author is grateful to Wellesley College for support of her sabbatical leave and to the Joan Shorenstein Barone Center on the Press, Politics and Public Policy of the Kennedy School, Harvard University where this research was carried out.

9. The television stimulus materials in the experiments were drawn from network television and the print exposures were the closest matching stories identified in the *Boston Globe* and either *Time*, *Newsweek*, or *U.S. News and World Report*. There is considerable evidence that network news and news magazines use very similar formats, however, selecting newspaper coverage posed considerable difficulties. Other researchers have resolved the issue of newspaper variation by relying on wire service copy. This study uses the *Boston Globe*, which is the largest circulation daily in the metropolitan region and whose style could be expected to be familiar to our subjects. Again, we cannot assert that the *Globe*'s coverage of the issues and usage of wire stories is or is not representative of what the "average" newspaper contains.

10. The checklist was in a simple yes/no/don't-know format. Eleven to thirteen common elements of information were identified for each of the five issues. Across all five stories there was an average of 7.7 correct answers on the pre-test and 8.6 correct on the post-test, for an average change score of .9, or almost one additional correct item.

11. Regression of Individual Attributes on Prior Issue Knowledge

Individual Attribute	B	Beta	Significance
Attention to issue news	.59	.35	.001
Cognitive skill	.14	.28	.001
Education	.28	.11	.003
Issue important	.20	.11	.003
Personal efficacy	.01	.01	.647
Political efficacy	.02	.04	.261
Print prime news source	.18	.03	.392
(Constant)	5.00		.000
Multiple R	.51		
R Square	.26		

12. An index of learning was computed from regressing the pre-test score on the post-test score and taking the residual. This residualized index is an adjusted score and can be interpreted as the amount of learning an individual exhibits compared to the overall sample mean and controlling for initial position on the pre-test.

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